# NEWSLINE

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# Celebration to salute U.S. troops

**By Dale Sprouse**
IBIS

The PSO Color Guard, units from the Lab's Fire Department and members of the LLNL Armed Forces Veterans Association will help the Tri-Valley area celebrate the return of U.S. troops from Iraq and Afghanistan Saturday.

The celebration, Operation Welcome Home, will feature a parade on First St. in downtown Livermore starting at 10 a.m. and a picnic and honors ceremony at Livermore's Robertson Park. The picnic runs from 11:30 a.m. to 6 p.m., with the ceremony set for 1:30 p.m. Food and beverage booths will be set up for the event.


**Lab employee Robert Dillman, a lieutenant commander in the Naval Reserves, stands in front of Baghdad International Airport.**

The parade, billed as the first West Coast parade for soldiers and sailors serving in Operation Enduring Freedom and Operation Iraqi Freedom, will feature representatives of deployed units, including the 101st Army Airborne and 23rd Marines. Organizers say they expect around 70 troops who were in Iraq to be in the parade.

A special parade float carrying photos of Tri-Valley military men and women should be of particular interest to Laboratory families with loved ones on active duty. Some Lab families answered a call from Operation Welcome Home for information on Tri-Valley military personnel deployed for Operation Iraqi Freedom and Operation Enduring Freedom.

Among the children of Lab employees now in Iraq is Army PFC Tammy Morris, daughter of Jay Morris of the Radioactive and Hazardous Waste Management Division. In Iraq since the end of April, PFC Morris is attached to the 47th Forward Support Battalion and is stationed at the Baghdad airport.

Several Laboratory employees have also served in Iraq and Afghanistan. Lab records show that 31 employees took full-time active duty leave at some point during fiscal years 2002 and

*See* **WELCOME,** *page 4*

## E-mail journal details rocky journey in Kuwait

For many of today's servicemen and women, "mail call" has given way to "you've got mail."

In fact, says Lab employee Robert Dillman, a lieutenant commander in the Naval Reserves who has been stationed at Camp Patriot in Kuwait since February, e-mail has made a "huge difference" in staying in touch with family, friends and colleagues.

"My last active duty deployment was on a ship and we had some limited e-mail," said Dill-

*See* **E-MAIL,** *page 4*

## JGI analysis of genomes of tiny microbes yield clues to global climate change

**By Charles Osolin**
NEWSLINE STAFF WRITER

By analyzing the genomes of several microscopic ocean-dwelling organisms sequenced at the U.S. Department of Energy's Joint Genome Institute (JGI), scientists are gaining new insights into how the planet's oceans affect its climate.

Comparative studies of four types of cyanobacteria — "photosynthetic" microbes that derive energy from sunlight, just like plants — were published today on the Websites of the journals *Nature* and *Proceedings of the National Academy of Sciences (PNAS)*. Three of the microbes — two strains of Prochlorococcus and one of Synechococcus — were among the first organisms to have their DNA sequenced at JGI in the late 1990s, and are the first ocean bacteria to be sequenced.

Cyanobacteria are important in part because of their ability to turn sunlight and carbon into organic material. As the smallest yet most abundant photosynthetic organisms in the oceans, cyanobacteria play a critical role in regulating atmospheric carbon dioxide, a chief contributor to global climate change. Scientists estimate that Prochlorococcus and Synechococcus remove about 10 billion tons of carbon from the air each year — as much as two-thirds of the total carbon fixation that occurs in the oceans.

Patrick Chain, a biologist at the Lab and co-author of the two *Nature* papers, said the three cyanobacteria sequenced by JGI were "hand-picked" to help scientists "begin to understand the physiological and genetic controls of photosynthesis, nitrogen fixation and carbon cycling."

The sequencing was funded by the DOE Office of Science's Office of Biological and Environmental Research as part of its mission to study climate change and carbon management.

"While many questions remain," said Raymond L. Orbach, director of DOE's Office of Sci-

*See* **MICROBES,** *page 4*

## Collaboration seeking nature of neutrinos

**By Anne M. Stark**
NEWSLINE STAFF WRITER

Using a 6,000-ton detector, Lab scientists on Thursday began gathering data on neutrinos as part of the Main Injector Neutrino Oscillation Search, (MINOS).

Joining an international team of scientists, Livermore researchers are using the MINOS detector, located deep in a historic iron mine in northern Minnesota, to explore the nature and properties of neutrinos. After four years of mining and construction, workers finished building the first of two detectors for the MINOS particle physics experiment.

Scientists have discovered three different types of neutrinos: electron, muon and tau. All three are hard to detect, but play an important role in processes such as radioactive decay and supernovae, the cataclysmic death of massive stars. They are also unleashed in nuclear reactors and in the detonation of nuclear weapons.

Another detector for the MINOS experiment, smaller in size than the one up and running in the

*See* **MINOS,** *page 4*

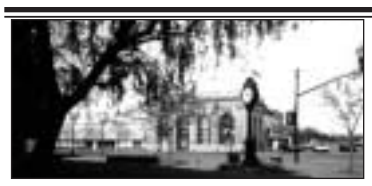
## *Walking high with diversity*

**Employees, their families, and community guests gathered together Thursday in the LLESA pool and picnic area to celebrate the unifying theme of "One World, One People." Multicultural activities ranged from Brazilian samba dancing to feasting on ethnic delicacies, a cultural clothing contest and a performance by Bomani Drum and Dance Ensemble..**

JACQUELINE MCBRIDE/NEWSLINE

**Tommy Smith, deputy associate director for Strategic Initiative and Diversity in the Administration and Human Resources Directorate, said: "This event contributes toward improving workplace relations by helping employees to understand different cultures more and have a greater awareness and realization that people are from different backgrounds and that is all right."**

**Jan Tulk, associate director of the Administration and Human Resources Directorate, also expressed her enthusiasm for the great turnout and enjoyable celebration.**



# LAB COMMUNITY NEWS

## Weekly Calendar

**Technical Meeting Calendar, page 4**

**Friday 15**

Faculty and researchers at UC Merced, along with researchers from Lawrence Livermore and Los Alamos labs, will hold a seminar today at the UC Merced campus located at Castle Airport in Merced. Featured speaker Daniel F.V. James of LANL's Theoretical Division will discuss **"Quantum Optics and Quantum Information,"** at 11 a.m. in the Almond Room.

**Tuesday 19**

Employees are invited to see how "**SGI Is Scaling Linux to New Altitudes (Irix, Too),"** a presentation of SGI products involving Linux. The demonstration takes place at 9 a.m. in the Central Cafe meeting room, Trailer 4675. For more information, call Sheri Savage, 3-6453.

A second in a series of seminars sponsored by faculty and researchers at UC Merced, the Lab and LANL features LLNL atmospheric scientist Philip Duffy discussing **"Simulation of Global Climate With High Resolution Models of the Atmosphere,"** at 11 a.m. in the Almond Room at the UC Merced campus, located at Castle Airport.

A **Fidelity retirement counselor** will be available Tuesday and Wednesday and Sept. 2-3 to assist with: assessing the current state of retirement accounts, learning how to diversify, planning asset allocation and identifying income strategies. If employees would like to set up a one-on-one consultation with a Fidelity representative, call 1-800-642-7131. When calling, be sure to specify that you are an LLNL employee.

**Thursday 21**

Fidelity is offering an **Estate Planning Workshop** today from 9–10:30 a.m. in Bldg. 571, conference room 1335. This is an educational workshop that will help employees create an estate plan. Space is limited. Register for the workshop by calling 1-800-642-7131 and specify that you are an LLNL employee. If you have any questions, contact the Benefits Office, 2-9957.

**Up & Coming**

The Lab's quarterly **blood drive** will be held in Trailer 4181 Sept. 8–11. Donors are encouraged to schedule an appointment in advance at http://llesa.llnl.gov/ and click on the words "Blood Drive," located to the left side of the window. Individuals without Internet access can schedule an appointment by calling the American Red Cross at 1-800-448-3543 and indicate company sponsor code is LLNL. Donor eligibility questions should be directed to the American Red Cross at 1-800-448-3543.

Lab employees who want to register to vote in the **special election Oct. 7** need to get their forms turned in to their county's registrar of voters by Sept. 22.

## House Science visit

BOB HIRSCHFELD/NEWSLINE

**Two congressional staff members of the House Science Committee, and an International Electronics and Electrical Engineers congressional fellow, visited last week for briefings about Laboratory homeland security technologies. The threesome received talks Thursday and Friday on Q-Division (Proliferation Detection and Defense Systems) technologies, such as the Homeland Operational Planning System and the Analytic Conflict and Tactical Simulations, as well as the cargo container test bed, the National Atmospheric Release Advisory Center and the Chemical/Biological Nonproliferation Program, among other topics. Shown standing left to right are: Q-Division Leader Greg Simonson; Elizabeth Grossman, a majority staff member; Dan Pearson, a minority staff member; and IEEE congressional fellow Joe Czika. Seated is NARAC Program Leader Don Ermak.**

## STUDENT ACTIVITIES

The student summer events end this week with three final seminars. Check out descriptions below or on the web at the student bulletin board, http://education.llnl.gov/sbb/, where you can register to attend.

**Wednesday 20**

**High Energy Density Laboratory Astrophysics**

Join Bruce Remington, group leader for the High-Energy-Density Physics Program at NIF, as he explores previous and current studies on collections of matter under extreme conditions of pressure, temperature and density. The talk is at 10:30 a.m. in the Bldg. 155 auditorium. Contact: Aaron Miles, 3-8131.

**Umpire Tools**

This talk will focus on a memory version of Umpire, an innovative tool that dynamically analyzes any MPI application for typical MPI programming errors, at 1:30 p.m. in Bldg. 219, room 163. Contact: Linda Bodtker, 3-0421, or Bronis de Supinski, 2-1062.

**Thursday 21**

**Engineering summer lecture series #7**

Harry Martz, Jr. will present "Nondestructive Characterization Technologies for Micro/Mesoscale Assemblies," which dicusses the study of assemblies with small to very small dimensions, features and structures using penetrating electromagnetic waves, acoustic waves or particles. The lecture takes place at 1:30 p.m. in the Bldg. 155 auditorium. Contact: Gay Spivey, 2-8897.

## IN MEMORIAM

### Paul Norman

Paul Norman of Cheyenne, Wyo., died Aug. 5. He was 65.

He was born Jan. 11, 1938, in National City, Calif. He was a mechanical engineering technician at the Laboratory. He also served in the U.S. Air Force.

He is survived by his wife, Judith R. Adams of Cheyenne; and three sisters, Pauline Price of Raymond, N.H., May Crampton of Prescott, Ariz., and Charlotte Berliner of Bedford, Texas.

Contributions may be made to UMC Hospice, 214 E. 23rd St., Cheyenne, WY 82001 or the Old West Museum, P.O. Box 2720, Cheyenne, WY 82003.

## NEWSLINE

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AROUND THE LAB

# Crisis assessment team helps prevent workplace violence

The Laboratory is committed to maintaining a safe working environment for all employees. Any employee who has concerns regarding physical violence and threats to safety in the workplace should contact the Lab's Crisis Assessment Team.

The Crisis Assessment Team was formed in 1995 and is chaired by Bob Perko, division leader of Staff Relations. Since its inception, the Lab routinely reminds employees of the team's existence and resources. Earlier this week, Director Michael Anastasio sent a memo to all Lab employees about the team.

"Any behavior that alerts concerns to potential violence, or one's feeling of safety, should be reported," Anastasio wrote to employees. "All threats are significant, need attention, and will be investigated."

With recent headlines of workplace violence, Anastasio and Laboratory managers felt it important to remind employees of the various resources the Laboratory has to address employee concerns regarding safety.

The Crisis Assessment Team includes representatives from the Office of Investigative Services, Health Services Employee Assistance Program, and Employee Relations. The team also relies on expertise from other Lab organizations, such as Safeguards & Security, Benefits and Legal Counsel. If there is reason to believe that the safety or well being of any individual is threatened, the team will be called on to evaluate the situation and recommend appropriate action to management.

Response on the part of the Crisis Assessment Team is immediate, emphasized Perko. "No concern is ever taken lightly," he said. "Workplace violence can happen in any organization, so it is important to be aware of certain warning signs."

Ninety percent of the people who have committed workplace violence show some of the following warning signs: sudden mood swings, erratic behavior, or an obsession with guns and other weapons.

"No one ever suddenly snaps — the warning signs are there," Perko said.

In addition, Staff Relations provides a briefing to supervisors on workplace violence, emphasizing the various warning signs and resources to address any issues.

Employees concerned about the potential of physical violence within the workplace, may report to one of the following:

- Staff Relations, 2-9501.
- Office of Investigative Services, 3-3688.
- Health Services' Employee Assistance Program (EAP), 3-6609.
- Employee Relations, 3-3043.

If the threat is an emergency and immediate help is required, call Protective Force Division, 2-7222.

# BRIEFLY

### *Personal Protective Equipment (PPE) Training deadline extended*

In July, the Hazards Control Department (HCD) announced the development of PPE training to meet the Work Smart Standard training required for eye, face, foot, head and hand protection and stated that this training should be completed by Nov. 1.

However, in order to more conveniently accommodate the staff who work in shops, maintenance activities, or on construction sites, HCD is obtaining Web based training (WBT) to replace the computer based training (CBT) modules. The release of this Web training is scheduled for October or November and the LTRAIN compliance deadline will be extended to six months from the date Web training is available.

If you are required to wear PPE, or if you are responsible for selecting the appropriate PPE for others, you must take this training. Like the current CBT training, the new Web class, for tracking purposes, will be split into four modules and you will only need to take the ones required for your job.

Laboratory staff must take HS4680-W "Personal Protective Equipment (PPE) in Analytical, Research and Quality Assurance Laboratories. The compliance deadline for this course will be extended to the same date as the non-laboratory training.

For further information about these courses, contact Ellen Anson, 2-1079, or Deana Root, 2-5158.

### *Websites offer tools and resources for new staff orientation*

The New Staff Orientation team has designed three customized Websites that provide tools and resources to assist supervisors, key staff and new employees with the orientation and assimilation process. The sites will serve as a central resource for current employees as well.

The three basic elements and Websites are:

•External employee site (accessible offsite): http://www.llnl.gov/llnl/02employment/nso_external/. Provides information for new employees that will help with the start process at the Lab.

•Internal supervisors site: http://www-r.llnl.gov/human_resources/sedd/nso_sup/. Provides information to help supervisors and key staff with orienting and assimilating their employees.

•Internal employee site: http://www-r.llnl.gov/human_resources/sedd/nso_emp/. Provides information to help new employees assimilate to the Lab.

For more information regarding the Websites, send an e-mail to NSO Program at mayhugh3@llnl.gov; or garcia77@llnl.gov.

# Technical Meeting Calendar

**Monday 18**

**ELECTRONICS ENGINEERING TECHNOLOGIES DIVISION**
"Modeling and Solving the Railcar Distribution Problem," by Sanjay Melkote. 10 a.m., Bldg. 1677, room 1085 ( P clearance). Contact: Cathy Kenton, 4-3875.

**ENERGY & ENIVIRONMENT**
"Reducing Feedback Uncertainty in Climate Models," by Syukuro Manabe. Program in Atmospheric and Oceanic Sciences, Princeton University. 10 a.m., Bldg. 170, room 1091. Contact: Sharon Mickels, 3-9279.

**Tuesday 19**

**CENTER FOR NONDESTRUCTIVE CHARACTERIZATION**
"Spectrum of the Reversal Operator: A New Approach to Target Characterization," by David H. Chambers. 1:30 p.m. Bldg. 235, Gold Room (room 1090). Contact Debbie Leal, leal1@llnl.gov, to obtain the abstract.

**PHYSICS & ADVANCED TECHNOLOGIES**
"The Difference Formulation: A New Picture for Thermal Radiation Transport in Thick Media," by Eugene Brooks. 2 p.m., Bldg. 2128, room 1000 (uncleared area), Contact: Alan J. Wootton, 2-6533.

**ENERGY & ENVIRONMENT**
"Use of Remote Sensing and Geospatial Analysis for Transportation Hazard Assessment," by George Hepner and Andrew Ford, University of Utah. 9 a.m., Bldg. 170, room 1091. Contact: Leah Acedillo, 3-4537. For more information, check http://en-env-r.llnl.gov/bbs2/viewtopic.php?t=192.

**Wednesday 20**

**INTEGRATED COMPUTING & COMMUNICATIONS**
The Macintosh Technical Seminar will feature a presentation by Apple's Worldwide Training Group. Information discussed includes available training targeted at accelerating the migration to Mac OS X for new users and technicians. 10:30 a.m., Bldg. 543 auditorium. Contact: Duane Straub, 2-9774, or straub1@llnl.gov.

**Thursday 21**

**ENERGY & ENVIRONMENT**
"A New Approach to Earthquake Hazard Studies," by Lawrence Hutchings, Earth Science Division, 1:30 p. m., Bldg. 170, conference room 1091. Refreshments will be served. Contact: Camille Vandermeer, 3-2672.

**August 26**

**CHEMISTRY & MATERIALS SCIENCE**
"Two-dimensional Mass Spectrometry of Biomolecules" by Evan R. Williams, Chemistry Department, UC Berkeley. 3:30 p.m., Bldg. 155 auditorium (room 1090). To obtain an abstract of his talk, see Website: http://www-cms.llnl.gov/cms_frontiers_ext/index.html. Contacts: Mike Fluss, 3-6665, fluss1@llnl.gov, or Kristine Ramirez, 3-4681, ramirez24@llnl.gov.

**The deadline for the next Technical Meeting Calendar is noon, Wednesday.**

Send your input to tmc-submit@llnl.gov. For information on electronic mail or the newsgroup llnl.meeting, contact the registrar at registrar@llnl.gov.

## E-MAIL

*Continued from page 1*

man, a Surface Warfare officer who finds himself part of the logistics infrastructure in Kuwait. "Here it is available most of the time."

Except for what he calls "one brief but notable foray into Iraq," Dillman, who has been selected for promotion to commander, has spent his tour of duty at Camp Patriot, a Kuwaiti naval base being used by the U.S. Navy, he said, as "a staging/throughput area of logistics support."

Dillman spent a year with Johnson Controls working on the National Ignition Facility before becoming a full-time Lab employee in September 2002. On Dec. 26, he took military leave from the Lab to be part of a planning group in San Diego preparing for mobilization. His formal mobilization came in January.

When Dillman was activated, his family (wife Hope and daughters Brenna and Hannah) relocated to Brentwood where Hope is a teacher at Liberty High School. "We thought it best that the kids be close to her job while I was away," Dillman said.

In Kuwait, unlike Iraq, the availability of international cell phones made it possible "to actually call home and talk almost once a week," said Dillman. But e-mail provided him the opportunity to create a "diary" full of memories.

In looking through his e-mails, he says, "I wince when I look at some of the grammar I pushed through. My story is that sometimes it was late, we were under Scud attacks, and I was tired. (Helps that it's true.)"

Here are brief excerpts from some of his e-mails home this past year.

***19 Feb 2003***

…The camp I am helping to run (grandiose, but it helps give me a sense of purpose) is one of the best set up in theater. The SeaBees have done an excellent job of setting up facilities. … The biggest enemy seems to be boredom, in between flurries of activity, for myself and others. E-mail helps, and I've managed to keep track of some of the news. …

***28 Mar 2003***

…Our business is war support over here, and business is booming! The entire base, each command and tenant in their own way, is contributing to support the folks who REALLY need your prayers and thoughts, those Marines, soldiers, sailors and airmen engaging the enemy…

***14 May 2003***

... the Marines are flowing through here on a very regular basis, and have been for the last few weeks. These guys are wonderful. Everyone single one I've talked with has been polite, courteous and ... well … professional. These are the guys that went through Basra, Najaf, Nasriyah and into Baghdad.

… I am humbled when I think about what they have done and been through. Every one of these guys (and gals) willingly put their lives on the line in a very real sense.

They did mainly because they were asked to, and they have a level of commitment and sense of duty most people, I think, will never truly understand. They rely on the fact that those asking them to go in harms way, do so for the right reasons. Pray for our leadership to make good use of the peace and freedom in Iraq that these brave men and women have fought to achieve...

***3 July 2003***

Right after my last note, I had a little bit of an adventure, one of the most interesting in my life.

…To move the story along, one Wednesday about noon finds a Pajero (Mitsubishi SUV — two priests and one security guy) in lead with a Honda Odyssey mini-van (driven by your narrator with one priest and another security guy) in trail headed for Baghdad. … We ended up at Baghdad International Airport … that's right, the ex-Saddam International Airport. … {then, we visited] the Baghdad city hall and … a few of Saddam's old palaces. … Amazing!!! … The opulence of the grounds and palaces and the EGO of the man! Huge heads with his face all over the place.

… Visited Babylon and was able to tour the ruins as well as the restored palace of Nebuchaneezer II. … nothing like standing in Babylon next to the Euphrates river to give one perspective on life, history and the place of our own time in it. Amazing! We were on the same ground that had nurtured western civilization over 4000 years ago. Words really fail me.

…After exploring Babylon for a few hours, we were on the road to get to our next destination. a base outside of Ur. … Ur was old before Abraham, founder of the three major monotheistic religions, was born and lived there. Amazing!! Incredible!!!

…I have seen things and visited places that I would never have thought possible.

…Now July 2 [back in Kuwait] … don't anybody worry about some kind of repeat of the above quest. It is FAR too hazardous up there {Iraq] these days… Working on preps for Fourth of July celebration and other projects.

## WELCOME

*Continued from page 1*

2003.

"Many of our employees had little time to prepare and were here today and gone the next," said Brenda Perry of Employee and Affiliated Personnel Services, adding that the Lab was not informed of "their exact destination."

Several employees, however, have acknowledged their deployment to the Middle East. They include NIF employee Robert Dillman, a lieutenant commander with the Naval Reserves, who is currently stationed at Camp Patriot in Kuwait (see article, page 1) and Special Response Team Sergeant Mike Guiso, an Army sergeant first class who serves as a Special Forces medic.

Guiso said he was in "Kabul and elsewhere" during his deployment to Afghanistan from September 2002 to June. His Afghanistan tour included a 73-day straight combat operation involving a team of two to three American service personnel and 15-20 Afghanis.

Laboratory employees also have been mobilized, but not sent overseas. For example, Kurt Hornbacker of the National Ignition Facility, a Naval Reserves lieutenant, was called up for 11 months during Operation Enduring Freedom. Initially he was asked to handle budget work but after six months was shifted to naval intelligence.

Hornbacker, who was assigned to the Office of Naval Intelligence in Washington, D.C., said his call-up caught him completely off guard. "All the other people in my unit got two weeks heads-up," he said. "I got two days."

For the parade, the Laboratory's Fire Department will send a company of four and two fire engines: 1841, a pumper, and 1861, used for wildland fires.

About 12 members of the Lab's Armed Forces Veterans Association are expected to join the parade, said the organization's Chelle Clements. If logistical arrangements can be made, they hope to appear with a rare 1943 International one-ton truck that saw Pacific service in WWII and a Korean War-era all-purpose Mule.

## MINOS

*Continued from page 1*

Minnesota mine, will be built at Fermi National Accelerator Laboratory in Batavia, Ill., and is scheduled for completion next year.

The operating detector is currently recording cosmic ray showers penetrating the earth. The data will provide the first tests of matter-antimatter symmetry in neutrino processes.

Though neutrinos are one of the most pervasive forms of matter in the universe, they are difficult to detect. In early 2005, Livermore scientists will use the Fermilab beam line to measure the properties of neutrinos.

The detector will catch the neutrinos created at Fermilab's Main Injector accelerator, which sits 450 miles away from the Soudan, Minn., mine. It will allow scientists to directly study the oscillation of muon neutrinos into electron neutrinos or tau neutrinos under laboratory conditions.

Using both detectors and the beam line, physicists hope to measure details about the nature of neutrino oscillations. For example, they hope to discover the fraction of a beam that can change from one type to another at a given energy by measuring the fraction of oscillations at each energy. In addition, they hope to determine the oscillation length, which is the distance a beam of neutrinos of a particular energy must travel to transform from one neutrino type to another and back again.

"Creating a beam line of neutrinos is crucial to determine the makeup and properties of these particles," said Peter Barnes, an LLNL physicist who is participating in the MINOS experiment.

In addition to Barnes, Livermore's MINOS team includes Ed Hartouni and Douglas Wright.

## MICROBES

*Continued from page 1*

ence, "it's clear that Prochlorococcus and Synechococcus play an immensely significant role in photosynthetic ocean carbon sequestration. Having the completed genome in hand gives us a first — albeit crude — 'parts list' to use in exploring the mechanisms for these and other important processes that could be directly relevant to this critical DOE mission."

Along with their contribution to the global carbon cycle, the cyanobacteria are of interest to scientists because of their ability to turn sunlight into chemical energy — a potential model for sustainable energy production. Before cyanobacteria DNA was decoded and analyzed, little was known about the molecular machinery these single-celled organisms use to perform their alchemy.

"It behooves us to understand exactly how, with roughly 2,000 genes, this tiny cell converts solar energy into living biomass — basic elements into life," said Sallie W. (Penny) Chisholm, professor of environmental studies at the Massachusetts Institute of Technology.

"These cells are not just some esoteric little creatures," she continued. "They dominate the oceans. There are some 100 million Prochlorococcus cells per liter of seawater, for example." Chisholm, a coauthor of one of the *Nature* papers, was part of the team that first described Prochlorococcus in 1988.

LLNL's Chain noted that the genome of one of the Prochlorococcus strains is significantly smaller than the other. "Among many other interesting findings, the genome sequences reveal that differential gene loss has played a major role in defining the photosynthetic apparatus from which these organisms derive their energy," he said.

Along with DOE, the National Science Foundation, the Seaver Foundation, the Israel-US Binational Science Foundation and France's FP5-Margenes supported the research.

Additional information on the DOE Microbial Genome Program can be found at www.ornl.gov/microbialgenomes.

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